

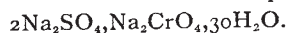
additional knowledge that has been rendered available during the past twenty years or so.

THE spontaneous racemisation of optically active compounds is discussed by S. Komatsu in the third of his "Studies in the Stereochemistry of Quinquevalent Nitrogen" (Mem. Coll. Sci., Kyoto, vol. i., No. 5, July, 1915). In the case of a typical optically-active iodide it was shown that fusion brought about the decomposition shown in the equation,



On allowing the fused mass to stand for a few days the iodide was reproduced, but when purified by recrystallisation from alcohol it was completely inactive. In this way direct proof was obtained of the theory first put forward by Pope in 1899 to account for the autoracemisation of these compounds.

THE fifth part of the Memoirs of the College of Science, Kyoto (July, 1915), contains a complete investigation of the system: sodium sulphate-sodium chromate-water. It is shown that at 15° C. the decahydrates of sodium chromate and sodium sulphate are mutually miscible in all proportions. At 25°, however, the formation of these mixed crystals is limited to 34 mols. per cent. of the chromate. When more chromate is added, the mixed crystals are decomposed, and the anhydrous sulphate separates. On further addition of sodium chromate, a new salt appears, which is probably a hexahydrated chromate not possessing the power of forming mixed crystals with the sulphate at 25° C. Indications have been obtained of the possible formation of a double salt of the composition



Attention may also be directed to a series of papers in part 3 of these memoirs on the alloys of (1) Sb and Te, (2) Te and Se, (3) Te and Sb, (4) Tl and Se. These include a complete investigation of each system from the point of view of the phase rule, and are illustrated by microphotographs of various alloys. The compounds detected include Sb₂Te₃, PbTe, Tl₂Se, TlSe, Tl₂Se₃, whilst Te and Se are shown to form two series of mixed crystals descending to a eutectic point at 95 per cent. Se and 130° C.

IN No. 3 of vol. i. of the Bacteriological Series of the Memoirs of the Department of Agriculture in India, Mr. N. V. Joshi claims to have isolated a new nitrite-forming organism from soil, differing morphologically from others hitherto known. Its thermal death point lies between 70° and 80° C., and its optimum temperature of action at between 25° and 35° C. An increased proportion of carbon dioxide in the atmosphere acts as a stimulus to the activity of this organism. 0.2 gm. of glucose in 50 c.c. of Omelianski's solution totally inhibits nitrite formation by this organism, and 0.2 gm. of asparagin greatly retards it. In solutions containing phosphates, ammonium chloride, ammonium sulphate, ammonium carbonate, asparagin and urea serve as sources of nitrogen; in the absence of phosphates, ammonium carbonate is the only substance which can be easily changed to nitrite.

IN a recent review of a small book called "An Introduction to Mining Science" (October 21, p. 198)

it was pointed out that in this as in all works which propose to teach just such portions of science as find direct application to any branch of technology the educational benefit to be gained from a study of the science is deliberately sacrificed to expediency. One of the authors of this book has taken exception to this statement. We have no objection to putting his protest on record, but we are unable to open our columns to a discussion of the points raised by the review. Our reviewer holds—and most people will agree with him—that in teaching an art the proper understanding of which requires the knowledge of certain portions of pure science, one of two methods may be adopted: either the student may be taught the science as a systematic entity, and then taught the incidence of such portions of the science as bear upon the industry in question, or else the teaching may be restricted to such portions of the science as are required for the special purpose in view. The former method has a higher educative value than the latter, because the reasoning faculties of a student are educated by the systematic study of the science in its logical development, whilst the latter method, even though it might teach all the scientific facts that bear upon an industry, sacrifices the educative advantages of the former.

MESSRS. Longmans and Co. announce for publication in their series of *Text-books of Physical Chemistry* part ii. of "Electro-Chemistry," by Dr. E. B. R. Pridoux; "A System of Physical Chemistry," by Prof. W. C. McC. Lewis; "Practical Spectrographic Analysis," by Dr. J. H. Pollok; and "Crystallography," by T. V. Barker. In their *Monographs on Physics* will be issued, "The Emission of Electricity from Hot Bodies," by Prof. O. W. Richardson; "Electric Waves," by Prof. G. W. Pierce; and "Atmospheric Ionization," by Prof. J. C. McLennan.

MESSRS. WEST, NEWMAN AND CO. have nearly ready for publication, "Vigour and Heredity," by J. Lewis Bonhote. It will be illustrated by coloured and uncoloured plates and diagrams.

OUR ASTRONOMICAL COLUMN.

THE DECEMBER METEORIC SHOWER.—This notable stream is an annually recurring one like the August Perseids, and it will be visible this year at a period when there will be little interference from moonlight. The radiant point apparently moves from near *theta* to alpha Geminorum, and the activity of the display seems prolonged over nearly three weeks. More observations are required as to the place of the radiant on successive nights. As observed by Mr. W. F. Denning at Bristol, the smoothed positions are approximately as under:—

Nov. 25	... 91+33	Dec. 6	... 104+33
26	... 92+33	7	... 106+33
27	... 93+33	8	... 108+33
28	... 95+33	9	... 109+32
29	... 96+33	10	... 110+32
30	... 97+33	11	... 111+32
Dec. 1	... 98+33	12	... 112+32
2	... 100+33	13	... 114+32
3	... 101+33	14	... 115+32
4	... 102+33	15	... 116+32
5	... 103+33	16	... 117+32

There is a companion shower, often rather strikingly visible at the same time, and its radiant point is about 10 degrees east of the chief system. It apparently shows a similar displacement to the eastwards at the rate of about 1 degree per day.

These showers from Gemini are sometimes extremely active, and on the night of the maximum, about December 11, furnish 20 or 30 meteors per hour for one observer. They have swift flights, not often with conspicuous trains or streaks, and are not recorded so easily and accurately as the meteors from Perseus in August or those from Leo in November.

COMET 1915d MELLISH.—Orbital elements for this comet have been calculated by Messrs. S. Einarsson and Alter, of the Berkeley Astronomical Department (Lick Observatory Bulletin, No. 273), from three observations made by Aitken on September 20, 21, and 23:—

$$\left. \begin{aligned} T &= 1915 \text{ Oct. } 13^{\text{h}} 39^{\text{m}} 59^{\text{s}} \text{ G.M.T.} \\ \omega &= 118^{\circ} 50' 30'' \\ \Omega &= 77^{\circ} 42' 52'' \\ i &= 53^{\circ} 32' 41'' \end{aligned} \right\} 1915^{\circ} 0 \\ \log q = 9.64669$$

Elements deduced by Messrs. Braae and Fischer-Petersen were given in this column for October 14. It is pointed out that the orbit plane is nearly the same as that of comet 1915, also discovered by Mellish. In the current number of the *Observatory* Dr. Crommelin states that the elements show a distant resemblance to those of the comet of 1402.

VISIBILITY OF MERCURY.—The last W. elongation ($18^{\circ} 49'$) of this planet occurred on November 7, and although only two-thirds of the possible maximum, the planet was seen by Mr. H. E. Goodson from the Hill Observatory, Salcombe Regis, ten days later on the morning of November 17, just before 6.15 a.m., attracting attention as a *conspicuous* naked-eye object, less than 1° above the eastern sky-line in a moderately bright dawn.

THE LIGHT-CURVE OF RZ CASSIOPELÆ.—A number of minima of this important circumpolar short-period eclipse variable have been followed by Sig. E. Paci, at the Royal Observatory of Catania (*Mem. Soc. Spett. Ital.*, September). The measures were made by means of a Töpfer wedge photometer attached to a Cooke telescope of 15-cm. aperture. The mean light-curve is based on 2274 measures made during eight minima since last July, and the magnitude ranges from 5.9-7.8 in 2h. 45m.

RECENT SCIENTIFIC WORK IN ITALY.

SINCE the outbreak of war in August, 1914, up to the end of May last, when Italy entered into the struggle, the output of scientific work in Italy seems to have suffered but little from the general upheaval which has in other countries so largely disorganised scientific effort. The *Atti* of the Royal Academy of the Lincei, which may be taken as representative of scientific work in general, embracing as it does all the different branches, shows during this period very little falling off from previous years either in the number or quality of the papers published. This may be seen from a brief review of the contributions of general interest published in vol. xxiii., part ii., and vol. xxiv., part i., which cover this period.

Prof. C. Acqua (vol. xxiii., ii., p. 78) has an interesting paper on the artificial absorption of liquids by the aerial parts of plants, in which a description is given of the striking effects produced by allowing living plants to absorb nutritive solutions through the

leaves or cut branches. Plants which ordinarily die down in the autumn were in this way kept in leaf throughout the winter by the absorption of saccharose, whilst in other cases plants placed in unsatisfactory conditions of growth, which ordinarily would cause rapid fading, were revived by administering sugar solutions through the leaves or stalks.

Dr. V. Paolini and R. Lomonaco (vol. xxiii., ii., 123) show that the green essential oil obtained from Italian-grown wormwood (*Artemisia absinthium*) contains about 10 per cent. of a mixture of α - and β -thujones, 48 per cent. of thujylic alcohol, either free or in the form of acetic, isovaleric, and palmitic esters, and smaller proportions of phellandrene, cadinene and a blue oil of undetermined composition.

From a study of the effect of very dilute acids on the germination of oats (*Avena sativa*), Prof. R. Pirota (vol. xxiii., ii., 166) concludes that the anion and kation of the acid have distinct effects, both chemical and biological, on the plant; the hydrogen acts on the root, and the reaction is localised therein, whilst the effect of the anion is localised on the growing points. From a similar study made by Dr. F. Plate on the effect of the chlorides of the alkali metals on germination, it is seen that the chlorides produce very different effects from the corresponding nitrates, the difference being due to the presence of a different anion.

In two papers on the formation of hydrocyanic acid in plants, Prof. C. Ravenna (vol. xxiii., ii., pp. 222 and 302) points out that in the estimation of small quantities of hydrogen cyanide in such cases, it is preferable to use potassium chromate as an indicator in titrating with silver nitrate solution rather than to employ Liebig's or Denigès's method. It is shown by a number of experiments on *Phaseolus lunatus* that this plant on germination at first produces hydrogen cyanide in increasing quantities, but that after a time the amount falls off. This plant, therefore, is no exception to the rule formerly established by the author with regard to the course of formation of hydrogen cyanide by cyanogenetic plants.

Dr. A. Clementi (vol. xxiii., ii., 517 and 612) describes a new method of determining the action of arginase, based on the quantitative estimation, by means of the formaldehyde process, of the new amino-group formed by hydrolysis of the arginine to urea and ornithine. Arginase is shown to be present, not only in the press juice of the liver of mammals, but also in aqueous extracts of these. In a later paper Dr. Clementi (vol. xxiv., i., 352) shows that Sørensen's titration process in presence of formaldehyde can be applied to mono-substituted amino-acids, such as sarcosine; as slight hydrolysis occurs in such cases, it is, however, necessary, in order that the results correspond with the whole of the acid present, that alkali should be added up to the point when an intense red coloration is produced with phenolphthalein.

Dr. Eva Mameli and Prof. G. Pollacci (vol. xxiv., i., 966) deal with the question of the direct assimilation of atmospheric nitrogen by plants. As the result of numerous analyses conducted under a system of rigorous control, it is concluded that the faculty of assimilating nitrogen directly from the air is far more widely distributed among plants than has hitherto been admitted. Nearly all chlorophyll-containing plants, from algæ to phanerogams, can, under special conditions, make use with greater or less activity of the atmospheric nitrogen. This property is most strongly marked in the Hydropteridæ, such as *Azolla carolinianum* and *Salvinia natans*, and in *Lemna major* and *L. minor*, but phanerogams such as *Cucurbita pepo*, *Acer negundo*, and *Polygonum fagopyrum* also possess it.